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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,820	09/22/2003	Robert R. Gallucci	135203-2	1028

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EXAMINER

HAMPTON HIGHTOWER, PATRICIA

ART UNIT

PAPER NUMBER

1711

DATE MAILED: 09/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/667,820

Applicant(s)

GALLUCCI ET AL.

Examiner

Patricia Hightower

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/22/2003
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

***Information Disclosure Statement***

The information disclosure statement filed September 22, 2003 has been considered and has been made of record.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4,6-29 and 32-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent claims 1,14,17,24,26,39,42,48 and the claims dependent therefrom, the applicants have recited bare numbers as the molecular weights for the aromatic dianhydride, the organic diamine monomer and the aromatic monoamine capping agent without defining how the molecular weights were measured. Clarification is requested.

The term "intimately combined" in claim 23 is a relative term which renders the claim indefinite. The term "intimately combined" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Clarification is requested.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-54 are rejected under 35 U.S.C. 103(a) as being obvious over Dellacoletta (USP 4,910,288) in view of Evans et al (USP 4,675,366) taken with Peters et al (USP 4,965,337).

Claims 1-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dellacoletta (USP 4,910,288) in view of Evans et al (USP 4,675,366) taken with Peters et al (USP 4,965,337).

Dellacoletta (USP 4,910,288) discloses a solution polymerization process for the preparation of polyetherimides comprising prereacting an aromatic bis(ether anhydride) with an aromatic diamine followed by the addition of phthalic anhydride end capping agent and further reacting to form an endcapped prepolymer, the prepolymer is heated to convert into a polyetherimide, wherein by this process the *formation of a low molecular weight PAMI an undesired byproduct (impurity) is greatly reduced. The PAMI is formed from the reaction of two moles of phthalic anhydride chain stopper and one mole of m-phenylene-diamine. See abstract; col. 2, lines 65 –col. 3, lines 1-37; col. Lines 5-23,36-42.*

*Dellacoletta uses aromatic bis(ether anhydrides) [cols.3- col. 7, lines 1-5]and aromatic diamines [col 7, lines 6-48] and polyetherimide forming conditions that are inclusive of those claimed. See col. 3, lines 40- col. 6; col. 7, lines 1-48, 50-61; col. 8, lines 5-8,9-14, 15-21,22-35, 36-42, 43-68;cols. 9-10; the examples 1-12; claims 1-10.*

The patentee teaches in **Example 1 a polyetherimide having a molecular weight of 24,7000  $M_N$  which is inclusive of the instantly claimed** molecular weight of the resulting polyetherimides (i.e., 10,000 to 60,000).

Although the reference is silent as to the monomers (dianhydride, diamine, monoamine) being essentially free of benzylic protons and the molecular weights of the aromatic dianhydride monomers and the diamine monomer, with the dianhydrides and diamines being inclusive of those claimed; said monomers are viewed as possessing said molecular weights and being essentially free of benzylic protons as instantly claimed since they are of the same structural identity.

However, the reference differs in not teaching as claimed the a monoamine endcapping agent in the specific amount, and the resulting polyetherimides having a  $T_g$  greater than 200°C, a polyetherimide composition and articles comprising the polyetherimide such as metallized reflective coating, reflectors, films, sheets, cookware, medical devices, engine components and automotive parts, food containers, etc.

Evans et al (USP 4,675,366) discloses an improved process for increasing the thermal stability of polyimide-type compositions comprising a nitrogen-containing polymer/polyimide having structural units of the formulas (I) and (II) from dianhydrides and diamines inclusive of those claimed; without sacrificing the solubility of such composition in nonpolar solvents, and a polyimide composition which can be used to coat electrical conductors by either solvent deposition or solventless extrusion. See col. 2, lines 63- col. Lines 1-65; col. 3, lines 35-68; col.

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4, lines 1-11, 12-68; col. 5, lines 6—68; col. 6, lines 20-68; col. 7, lines 5-15, 16-35, 36-62; col. 8, lines 28-41, 59-62, 63-68; col. 9, lines 1-12, Table 1, 24-29, 30-68; col. 10, lines 821, 59-68; col. 11, lines 1-45; examples 1-2;; col 12, lines 64- col. 13, lines 1-6.

*Evans teaches the structural units (I) and (II) derived in part from diamine reactants and the preferred diamines are meta-phenylenediamine, (m-PD) and isomers of diaminotoluene (DAT) in selected proportions. The presence of the alkyl or alicyclic groups attached to an aromatic group on the diamines and/or on the other monomers (dianhydride) results in an increase in the glass transition temperature of the resulting polyimide polymer. The alkyl groups or alicyclic groups also act as functional sites for the oxidative crosslinking reaction of the polymer. See col. 2, lines 15-54, 55-65; col. 6, lines 1-4, 20-42, 43-68; col. 7, lines 1-60; col. 8, lines 59-68; Table 1; col. 9; col. 10, lines 59-68; col 11, lines 1-44; examples 1-2. The resulting polyimides exhibit Tg of 233, 269, 226, 261 that meet the claimed Tg of greater than or equal to 200°C. See Table 1.*

*At col. 12, lines 64- c0. 13, lines 1-6, the patentee teaches the polyimide composition can be adjusted to easily satisfy various requirements for film hardness, flexibility and thermal stability; the compositions can be used for aviation and automobile applications, for decorative and protective purposes and ah high temperature electrical insulation for motor slot liners as well as for coil and cable wrappings.*

The patentee teaches the polyimides and polyamic acids are formed by the reaction of dianhydrides with diamines , typical solution polymerization, the

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dianhydride and diamine monomers are combined with a chain-stopper such as a phthalic anhydride, a catalyst and a chlorinated solvent such as ortho-chlorobenzene under a nitrogen atmosphere. See col. 8, lines 28-50.

Peters et al (USP 4,965,337) discloses wholly aromatic polyetherimides having sulfur containing groups in the backbone, exhibiting extremely high T<sub>g</sub>, glass transition temperatures, high chemical resistance and thermogravimetric stability, prepared from equimolar amounts of diamines and dianhydrides for high molecular weight polyetherimides. However, in certain instances, a slight molar excess (about 1 to 5 mol percent) of diamine or dianhydride can be employed resulting in the production of polyetherimides having terminal amine or dianhydride groups. See col. 6, lines 4-32,33-40; abstract; col. 1, lines 55 - col. 8, lines 1-33; the examples and the claims.

The patentee teaches at col. 6, lines 32-40, in preparing the polyetherimides, one may include in the reaction mixture a chain-stopping agent such as a monofunctional aromatic amine such as aniline or monoanhydride such as phthalic anhydride. The chain-stopping agent is generally present in the amount of from about 1 to 7 mol percent of the total anhydride or amine reactants.

It would have been obvious to one of ordinary skill in the art at the time the invention was made that the method of preparing a polyetherimide with reduced impurities as taught by Dellacoletta could have been modified by incorporating the *diamine reactants as taught by Evans, further selecting the preferred diamines meta-phenylenediamine, (m-PD) and isomers of diaminotoluene (DAT)*

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*in selected proportions that have an alkyl or alicyclic group attached to an aromatic group on the diamines and/or on the other monomers (dianhydride) resulting in an increase of the glass transition temperature of the polyimide polymer. The resulting polyimide polymer/ polyetherimide could have been further modified by endcapping the the polyetherimide having terminal dianhydride groups with a chain-stopping agent such as a monofunctional amine such as aniline as taught by Peters to control the chain grow of the polymer; thereby controlling the resulting molecular weight of the polymer.*

**Prior Art**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These references are cited to show the state of the art of polyetherimides and methods of preparing; Puyenbroek, Cella, Buchannan, Penning, Brunelle and Hausladen.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia Hightower whose telephone number is (571) 272-1073. The examiner can normally be reached on M-F from 9:30 A.M. - 6:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on (571) 272-1078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



P. Hampton Hightower  
Primary Examiner  
Art Unit 1711

P. Hightower;ph  
September 28, 2004